



JSC played host to the Jason Project V Expedition Planet Earth activities via satellite linkup. Story on Page 3.



Activities to ready the STS-59 mission for its early April flight are underway. Story on Page 4.

Space News Roundup

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No. 11



NASA Photo

In *Columbia's* cargo bay, the dexterous end effector is maneuvered toward the carrier latch assembly during demonstrations conducted on the STS-62 mission. Three crew members used DEE to insert pins into a series of increasingly smaller holes as part of in-flight testing of the DEE concept.

DEE concept proves its value

By Eileen Hawley

For three days, three astronauts on board *Columbia* demonstrated the effectiveness of a new end effector and grapple fixture designed for use with the orbiter's remote manipulator system.

The Dexterous End Effector incorporates three separate components developed at JSC—a magnetic end effector, a targeting and reflective alignment concept camera system, and a carrier latch assembly—as well as a force torque sensor developed at NASA's Jet Propulsion Laboratory.

The ultimate goal of the DEE project is to increase the robot arm's dexterity and alignment accuracy and provide operators with a sense of touch when dealing with objects in space.

"This is a demonstration of technologies which enable the orbiter system to do things it was not previously able to do," said Leo Monford, DEE project manager. "One of the things we're trying to find is the limit of that dexterity. We have tested this software for many years on the ground, but things like the force torque sensor, can not be tested

effectively in a gravity environment since the gravity masks the forces you're trying to display."

Beginning on Flight Day 11, Mission Specialists Marsha Ivins, Pierre Thuot and Sam Gemar took turns participating in a series of tasks designed to demonstrate that dexterity. The astronauts attempted to manipulate a peg into a series of holes with progressively smaller tolerances. Ivins completed the "peg in the hole" demonstration so successfully, that Flight Director Chuck Shaw likened the display to "hitting

Please see DEE, Page 4

Tethered Satellite System set to fly again

The Tethered Satellite System, originally flown on STS-46 in July, 1992 is set to fly on board a shuttle flight in February, 1996, according to NASA Administrator Daniel Goldin and Italian Space Agency Special Administrator Professor Giampietro Puppi.

TSS was not fully deployed during STS-46 due to mechanical interference in the satellite's deployer reel assembly. The reflight will focus on science objectives not accomplished during the STS-46 mission.

The reflight was planned for some time between NASA and ASI, but a formal commitment could not be

made until NASA received U.S. congressional approval to spend FY 1994 funds.

Last year, the two space agencies completed a study of the jointly-developed TSS, confirming their judgment of its usefulness as a unique shuttle-based experiment carrier.

The TSS could place a satellite into the Earth atmospheric regions that are difficult to study. These regions lie above the range of high altitude balloon flights and below the altitude of free-flying science satellites.

The reflight is expected to com-

plete the demonstration of the technology of deploying satellites on long, gravity-gradient stabilized tethers in space, and verify the value of such systems for scientific and technological research.

TSS consists of a deployer system, 13.47 miles of tether and a 1,139 pound, and a five-foot diameter spherical satellite. The satellite, developed by ASI, contains payload, service and propulsion modules. The payload module will carry several science instruments while the service module houses power, data handling, telemetry and navigation systems.

Space research mission to land today in Florida

By Kelly Humphries

A jam-packed mission of microgravity research and space technology tests is scheduled to glide to a smooth landing at Kennedy Space Center this morning.

Columbia and its crew of five were scheduled to land at 7:09 a.m. CST, making the United States Microgravity Payload-2 and Office of Aeronautics and Space Technology-2 mission the second longest shuttle flight to date. Any delays due to weather or mechanical problems, even for just one orbit, will make STS-62 the longest shuttle flight in history behind October's 14 day, 13-minute STS-58 mission.

During an in-flight news conference, Commander John Casper, Pilot Andy Allen and Mission Specialists Pierre Thuot, Sam Gemar and Marsha Ivins said they were pleased to be a part of research that could some day result in fast computers, lighter metal alloys for cars, new drugs and new

technologies for future space missions.

"The roads to improvements and cures are not exciting and are not thrilling, but the cure or the new design or the improved materials are probably the most exciting thing that you can imagine," Ivins said.



Scientists for both the USMP-2 and OAST-2 packages were excited about the results returned from their instruments, operated remotely by investigators working in the payload control centers at Marshall and Goddard Space Flight Centers.

"The USMP-2 mission has gone extraordinarily well," said USMP-2 Mission Scientist Peter Curreri. "We've achieved our primary science for all our payloads. We have made basic science discoveries that we had not anticipated. It has been, in my opinion, a fantastically rich mission scientifically."

The Isothermal Dendritic Growth Experiment, looking at the solidifica-

Please see USMP-1, Page 4



Photo by Jack Jacob

COSMIC CONFERENCE—Becky Simmons of the Lunar and Planetary Institute discusses the activities taking place at the Lunar and Planetary Science Conference with Pam Solomon. Some of the top lunar scientists participated in the conference which ends today at the Gilruth Center.

Job fair is underway

The On-Trac Job Fair is underway at the University of Houston-Clear Lake today.

The job fair runs from 11 a.m.-7 p.m. today in Atrium II in the Bayou Building at UH-Clear Lake. Sponsored by the Aerospace Job Resource Center, the fair is designed to assist unemployed aerospace professionals in the Clear Lake area.

More than 40 high-technology employers are expected to attend the fair. In addition, several seminars focusing on refining job search skills and resources for unemployed workers are planned throughout the day.

Shuttle fleet modifications will be done in Palmdale

All major modifications required to support NASA's space shuttle fleet will take place at the Rockwell International facility in Palmdale, Calif., according to an announcement issued by Space Shuttle Director Tom Utsman on Tuesday.

Several factors contributed to the decision to conduct modification works at the Palmdale location, including the expanding requirements associated with the Russian cooperative effort, the ability to support future international space station operations, and the desire to conduct shuttle prelaunch processing at Kennedy Space Center in the most efficient manner possible.

"After evaluating the location for performing major modifications to the orbiters, I believe the best policy is to continue to perform these mod-

ifications at the Palmdale facilities," Utsman said. "This will allow the KSC team to concentrate all its efforts on the safe and efficient shuttle vehicle prelaunch processing."

Currently, space shuttle *Atlantis* is undergoing major modification work at Palmdale. The modifications will allow the vehicle to dock with the Mir space station as part of STS-71 activities targeted for June, 1995. *Atlantis* is scheduled to return to KSC in June for its next flight on the STS-66 mission this fall.

Additional major modification work scheduled at the Rockwell facility includes preparing a second orbiter, *Discovery*, to have the ability to dock with the Mir space station in support of Phase One of the new Russian cooperative effort. Phase One consists of up to 10 missions to

Mir, including rendezvous, docking and crew transfers between 1995 and 1997. The orbiters will assist with crew exchange, resupply and payload activities for Mir.

Discovery also is scheduled for additional modifications including the initial work associated with installation of the Multifunctional Electronic Display System and a fifth cryogenic tank set. *Discovery* also will undergo the same Mir modifications done to *Atlantis* so that *Discovery* can support Phase One cooperative efforts.

The decision to continue major modification work at Palmdale and to modify a second orbiter to make it capable of docking with the Mir is expected to have only a slight impact on the near-term shuttle flight manifest.

Columbia is next in line for major modification work and will be sent to the Palmdale facility following the STS-65 mission targeted for July. The STS-67/ASTRO-2 mission, originally scheduled for *Columbia* in December 1994, will be flown aboard *Endeavour* in early January 1995.

Columbia is expected to arrive at Palmdale in September with work projected to last seven to eight months. Among the improvements scheduled for *Columbia* is the initial work associated with the MEDS system.

Discovery is expected to arrive in Palmdale in September, 1995 following the STS-70 mission. Following modifications, it will fly a docking mission with Mir on STS-79 in June 1996.

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

Astroworld Early Bird: Tickets available for one-day admission for 1994 season. Cost is \$16.75 per person. Tickets must be purchased by May 31.

Seaworld of Texas: Discount tickets: adult \$20.95; child (3-11), \$14.25.

Fiesta Texas: Discount tickets: adult \$18.95; child (4-11) and seniors (55+), \$14.25.

Moody Gardens: Discount tickets for two of three different attractions: \$9.

Entertainment '94 Coupon Books: Bay Area /Galveston /Downtown or FM 1960 /Downtown: \$30 each, \$1 off first book for civil servants. Gold C Books: \$8.

Space Center Houston: Discount tickets: adult, \$7.50; child (3-11), \$4.50; commemorative, \$9.95.

Metro tickets: Passes, books and single tickets available.

Movie discounts: General Cinema, \$4.75; AMC Theater, \$4; Loew's Theater, \$4.50.

Stamps: Book of 20, \$5.80

JSC

Gilruth Center News

Sign up policy — All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a NASA badge or yellow EAA dependent badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304.

EAA badges — Dependents and spouses may apply for photo identification badges from 6:30-9 p.m. Monday-Friday; 9-11 a.m., 1-3 p.m. and 6:30-9 p.m. Wednesdays; and 8 a.m.-4 p.m. Saturdays. Dependents must be between 16 and 23 years old.

Ballroom dancing — Classes meet from 7-9:30 p.m. Thursday nights. Cost is \$60 per couple for eight weeks. Beginner, beginner-intermediate, intermediate and advanced instruction is provided.

Weight safety — Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. March 22. Pre-registration is required. Cost is \$5.

Defensive driving — Course is offered from 8:15 a.m.-3 p.m. Saturday. Next class is April 9. Cost is \$19.

Scuba class — New class begins April 7. For additional information, contact Bernie Ehlers, 333-5364.

Creative writing — Five-week basic creative writing class meets from 6:30-9 p.m. beginning March 31. For additional information, contact Barbara Reeves, 473-0748.

Aerobics — High/low-impact class meets from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

Exercise — Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for eight weeks.

Aikido — Martial arts class meets from 5-7:30 p.m. Tuesdays and 6:15-8:15 p.m. Wednesdays. Black Belt class from 6-8 p.m. Fridays, requires instructor permission. Cost is \$25 per month.

Softball tournament — Men's Open C pre-season softball tournament will be held March 26-27. Registration deadline is 7 p.m. March 24. Cost is \$100.

Stamp club — JSC Stamp Club will meet from 7-9 p.m. every other Monday. For more information, call Dianne Kerkhove at 554-2764.

Fitness program — Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Wier at x30301.

JSC

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Ads may be run only once. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2. No phone or fax ads accepted.

Property

Rent: Galveston condo, furn, sleeps 6, Seawall Blvd and 61st St, dly/wknd/wkly. Magdi Yassa, 333-4760 or 486-0788.

Rent: Arkansas cottage, Blue Mt Lake, furn, 4 ac, \$250/wkly/\$50/dly. x33005 or 334-7531.

Rent: Galveston beach house, dly/wkly, CA/CH, furn. Ed Shumilak, x37686 or 326-4795.

Sale: Galveston beach house, 3-2, CA/CH, furn. Ed, X37686 or 326-4795.

Sale: TaylorCrest, 4-3-2-5D, 3200 sq ft, pool/spa, art studio, cul-de-sac, 4% to buyer's agent, \$282.5k. Richard, x30271 or 326-4963.

Sale: Oakbrook West, 4-2-2, ceiling fans, FPL, lg yd, \$99.5k. Denise, x31846 or 486-5146.

Sale: Marina townhome, LC, 2-2, \$99.5k. Steve, 202-358-0889 or 703-532-3415.

Sale: Nassau Bay, 4-2-2, \$155.5k. 333-3876.

Lease: Piper's Meadow, 3-2-2A, lg living area w/FPL, ceiling fans, \$850/mo + dep. Walter, 332-1609.

Lease: Townhouse LC, 2-2-5-1, W/D/refrig/FPL, security lights, \$750/mo. 332-8017.

Sale: Friendswood, 3-2-3, both formals, new A/C, appl, cul-de-sac, Gary, x31059 or 480-9716.

Sale: Condo, Ft. Lauderdale, FL, time share, have video & flr plans, \$12k. x36851 or 332-8017.

Rent: House, 2 BR, single or couple only, \$450/mo. 326-3008.

Sale: Friendswood, Heritage Park, 4-2-5-2+, 2137 sq ft, FPL, spa, \$106.9k. 992-1466.

Sale: Friendswood, 4-2-5-2, jacuzzi in master bath, both formals, cent alarm, \$175.5k. 482-8595.

Lease: CLC, 1 BR, condo, sec alarm, W/D, FPL/appl. Jim, x44632 or 488-7901.

Sale: Piper's Meadow, 3-2-2, \$82.9k. 486-1469.

Sale: Baywind I, 2-1-5-2, W/D, avail 3/15/94, \$35k. Tom, 333-3992.

Rent: Wolf Creek Co, sleeps 6, no smoking/no pets. Bob, x30825 or 998-7372.

Lease: Kirkmont, 3-2-2, cul-de-sac, \$595/mo + dep. Diep, x47472 or 488-7743.

Rent: Condo, Winter Park, Co, furn, 2-2, sleeps 6. 488-4453.

Sale: Clear Lake Shores, 3 BR, \$89.7k. 538-1849.

Sale/Lease: Oakbrook, CLC, 4-3-2, 2600 sq ft, pool, \$99.9k or \$1150/mo + pool serv. x45405 or 286-3057.

Rent: House Bacliff, 2-1. x45405 or x37439 or 286-3057.

Sale: Sagemont, 3-2-2, both formals, approx 1800 sq ft, \$72k. Ben, x34339 or 481-1439.

Cars & Trucks

'82 Dodge Stakebed, DOT inspected, side-

boards, \$5k OBO. 485-7274 or 639-3138.

'86 Hyundai Excel, 4 dr, 5 spd, A/C, AM/FM/cass, 70k mi, \$1.3k. Denise, x31846 or 486-5146.

'82 Camaro, A/C, auto, 2.8L V6, AM/FM/cass, ex cond, low mi, \$2.5k OBO. 991-5280.

'86 Nissan 300 ZX turbo, auto, blk, T-tops, AM/FM/cass, A/C, ex cond. 996-7716.

'89 Ford Aerostar Minivan, Eddie Bauer, A/C, all pwr, ex cond, \$9250. 980-7481.

'78 Porsche 928, brown, auto, ex cond, 75k mi, \$8.5k. Bill, 244-8889.

'87 Pontiac 6000 STE, auto, V6, ex cond, 53k mi, \$5495 OBO. Steve, 783-5386.

'87 Skylark, loaded, \$1.9. Mary, 991-7247.

'82 Chevrolet Caprice, auto, no A/C, V8, \$600. x45826 or 486-2022.

'92 Honda Civic VX, 3 dr, 5 spd, A/C, AM/FM/cass, ex cond, 11k mi, \$9.8k neg. Dennis, x31733.

'86 BMW 528E, sunroof, AM/FM/cass, loaded, \$6.5k; '89 Daytona, A/C/AM/FM, \$3475. Charles, 426-2039.

'91 Honda Civic, 3 dr hatchback, ex cond. Gary, x37896 or 333-2751.

'91 GMC Sanoma PU, 52k mi, w/ht/wht camper shell, PS/PB. x38278 or 334-7258.

'61 VW Beetle, rebuilt eng, org equip, \$2.6k. 488-3389.

'83 Mazda GLC hatchback, AM/FM/cass, 140k mi, \$800 OBO. 554-6201.

'91 Toyota Corolla, 36k mi, auto, A/C, AM/FM, ex cond, \$7895. 333-7167.

'85 Dodge Ram Charger 4x4, 318 cu in, 65k mi, \$5k. 554-4033.

'74 Triumph Spitfire, remov hard top, \$1.9k. Craig, x36206 or 280-0176.

'85 Ford Mustang, V6, auto, A/C, AM/FM, \$475 OBO. Kim, x35560.

'84 Dodge Caravan LE, A/C, auto, AM/FM, 5 pass, 77k mi, ex cond, \$3.8k. x38158 or 532-1100.

'67 Classic Pontiac Firebird, 326 auto, PS/PB, \$1k OBO. Sharon, x36534 or 486-7428.

'91 Suburban Silverado Regency, custom, w/ht/gray int, 37 k mi, \$15k. Judy, x34161.

'84 Toyota Supra, 91k mi, PWR, sunroof, \$3.4k. Mike, x30993 or 333-1856.

Boats & Planes

224 Chaparral, cuddy cabin w/head, 200 Hp Johnson, radio, depth-finder, out riggers, ex cond, \$52.5k. 980-7481.

Shrimp boat, 10 x 25, nets, drs, radio & trailer. Mary, 991-7247.

Chaparral 187, 140 Hp Merc I/O, SS prop, electronics, ex cond, \$5.7k. x37954 or 481-1605.

'90 Hunter 30' aux sloop, A/C, roller furling, digital knot/depth/wind, autopilot, Bimini, ex cond, \$52.5k. 980-7481.

Laser Sailboat, 13'11", L.O.A., 76 sq ft sail, centerboard. BO. Jerry, x35226 or 333-2778.

Two Windsurfer sailboards, \$90 ea, \$150/both. Craig, x36206 or 280-0176.

'92 Baymaster 18'6", 115 Hp Johnson, salt water trolling motor, fish finder/depth sounder, \$10.5k. Steve, x47698 or 482-3696.

Chrysler 22' sailboat, sleeps 6, galley & head, fixed keel, 5 Hp, mainsail & two jibs, ex cond, \$2.8k. 282-1727.

'70 Glaston 16' bass boat, '79 70 Hp Evenrude, pwr TLT, trolling motor, depth finder,

JSC

Dates & Data

Today

Cafeteria menu — Special: tuna noodle casserole. Total Health: broiled chicken breast. Entrees: deviled crabs, broiled pollock, liver and onions, broiled chicken with peach half, Reuben sandwich. Soup: sea-food gumbo. Vegetables: Italian green beans, cauliflower au gratin, steamed rice, vegetable sticks.

Monday

AIAA conference — JSC and the American Institute of Aeronautics and Astronautics will co-sponsor CIRFSS '94 beginning at 9 a.m. March 21 at South Shore Harbor Resort and Conference Center. The theme of the four-day conference is "Sharing Technology in the National Interest." For additional information, call (202) 647-7463.

Cafeteria menu — Special: Italian outlet. Total Health: herb flavored steamed pollock. Entrees: barbecue beef, spare ribs with kraut, steamed pollock, French dip sandwich. Soup: black bean and rice. Vegetables: California mix, okra and tomatoes, vegetable sticks, ranch style beans.

Tuesday

Cafeteria menu — Special: corned beef hash. Total Health: baked potato. Entrees: meatballs and spaghetti, grilled liver and onions, beef cannelloni, ham steak Hawaiian. Soup: split pea. Vegetables: winter blend mix, seasoned cabbage, breaded squash, lima beans.

Wednesday

Astronomy seminar — The JSC Astronomy Seminar will meet at noon March 23 in Bldg. 31, Rm. 129. For more information, call Al

Jackson, 333-7679.

Freedom fighters — The Space Station Freedom Fighters will meet at noon and 5 p.m. at the Freeman Memorial Library, 16602 Diana. For more information, contact David Cochran, 482-7005.

Cafeteria menu — Special: smoked barbecue link. Total Health: roast porkloin. Entrees: cheese enchiladas, roast pork and dressing, baked scrod, baked chicken, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, Spanish rice, turnip greens, peas and carrots.

Thursday

Russian speakers — Practice Russian language skills from 11 a.m.-1 p.m. March 24 in the Bldg. 3 cafeteria. For more information, call Jack Bacon, x38725, or Amy Mendez, x38066.

Cafeteria menu — Special: chicken fried steak. Total Health: roast beef with gravy. Entrees: roast beef with dressing, steamed pollock, lasagna with meat, baked chicken, French dip sandwich. Soup: beef and barley. Vegetables: whole green beans, butter squash, cut corn, black-eyed peas.

Friday

AIAA symposium — The American Institute of Aeronautics and Astronautics will host its 1994 Technical Symposium May 19 at the University of Houston - Clear Lake. Abstracts must be submitted for consideration March 25. For information and guidelines, contact Dudley Nelson, 333-7054.

Cafeteria menu — Special: fried chicken. Total Health: vegetable

lasagna. Entrees: broiled cod fish, beef stroganoff, vegetable lasagna. Vegetables: steamed broccoli, carrots vichy, Italian zucchini, breaded okra.

March 30

Infertility seminar — The JSC Clinic will present an infertility seminar from 7-9 p.m. March 30 at the Gilruth Center, Rm. 216. Dr. Vicki Schnell will discuss causes and treatments for infertility. For reservations and more information, contact Joyce Mason or Lynn Hogan, x37783.

Astronomy seminar — The JSC Astronomy Seminar will meet at noon March 30 in Bldg. 31, Rm. 129. For more information, call Al Jackson, 333-7679.

March 31

AIAA meets — The Houston Section of the American Institute of Aeronautics and Astronautics will host a dinner meeting beginning at 5:30 p.m. March 31 at the Gilruth Center. Reservation deadline is noon, March 28. For reservations and more information, contact Frankie Hap, 333-6064; Ardell Broussard, 283-1040; Sarah Leggio, 282-3160; or Mary Ann Bivona, 483-1350.

Russian speakers — Practice Russian language skills from 11 a.m.-1 p.m. March 31 in the Bldg. 3 cafeteria. For more information, call Jack Bacon, x38725, or Amy Mendez, x38066.

April 6

Astronomy seminar — The JSC Astronomy Seminar will meet at noon April 6 in Bldg. 31, Rm. 129. For more information, call Al Jackson, 333-7679.

Swap Shop

\$1750. Larry, x49103 or 922-1696.

'82 Skeeter Bass Champ, 16', 60 Hp, Evin, LW, DF, TT, \$2.8k OBO. David Brown, 409-766-6357 or 409-744-1670.

Cycles

'92 Honda Sabre 750, 27k mi, ex cond, \$1950 OBO. 470-0820.

Audiovisual & Computers

AM/FM stereo recvr, 25 wpc w/bass Reflex spkrs, \$75. x36851 or 332-8017.

US Robotics Courier HST Dual std cellular Fax modem, V.32 Turbo at 19,200 BPS, V.17 group III Fax support at 14,400 BPS, new \$1295/sell \$550. Tony, x47401 or 482-4156.

IBM PC/XT, 640k RAM, 2-5.25 floppy's, green monochrome mon, kybrd, \$150. Jerry, x38173 or 480-8220.

AMIGA500 pkg/mon, ext dr, Panasonic 24 pin printer, W.Perfect 4.1, DeluxePaint III, Pagesetter, Advantage, \$500. Kathy, x36807 or 475-0975.

IBM compatible, NEC-286 computer, 640k RAM, 44MB HD, 2 FD (3&5), color mon, kybd, software, \$600. Earl Rubenstein, 480-1998.

AT&T 6300 PC, 640k RAM, 20 MB HD, color mon, \$200 OBO; Panasonic KX-P1524 24 pin printer, \$200. x35917 or 331-9453.

Leading Edge Model D (8088), 640k RAM, high resolution monochrome, 30 MB HD, 5.25 FD kybd, software, \$200. Andrei, x35059 or 532-3342.

Photographic

Nikkor AI-50 mm f1.4 lens, \$95; Nikkor Ais-28 mm f2.8 lens, \$145; Nikkor 80-200 mm f4 zoom lens, \$450. x31538 or 480-9356.

Musical Instruments

Hagstrom 12 string elect guitar w/case, \$175; Olympic acoustic guitar \$85; Ames 4 string bass guitar, \$175 w/case; Pearl 5 piece w/ht drum set w/cases, \$800; 10 band graphics EQ, \$85; Roland TR505 drum mach w/Midi interface, \$90. Ron, x38594.

Wurlitzer Spinnet organ model 4075, Multi-matic percussion, elect dual speed spectratone, ex cond, \$550. 946-3214.

Quation Acoustic elect bass guitar, ex cond, \$400 OBO. x47367 or 538-3338.

1919 Busch & Gertz player piano, refinished, box of orig music scrolls, \$300 OBO. Kathy, x36807 or 475-0975.

Dean Markley practice amplifier, make offer. 486-4958.

Pets & Livestock

AKC reg Boston terrier puppies, 3 female, 4 male, 2-2-94. Mike, 489-4558 or 639-3138.

AKC reg Siberian Husky, female, blk/wht, \$150 OBO. 991-5280.

AKC reg Dalmation, 11 months, shots, wormed, \$150. x38688.

Pair of mated love birds w/cage, access, \$75. Brian, 996-8567.

Lost & Found

Lost woman's blue topaz ring. Mike, x30291.

Household

Sleeper sofa w/matching loveseat, off-wht w/earth tones, \$300; trundle bed, \$100; Pana-

sonic rack stereo w/spkrs, \$200. x33736.

Basset, solid wood book shelves/entertainment center, \$200 - \$500/unit. 869-5557.

Dining room or occasional chairs, Art Deco styling, curved arms, grey upholstered/ chrome, 4/\$200. Linda, x32701 or 488-8588.

Couch, \$35; 2 cushion chairs, \$30 ea; sm desk, \$30; 2 lamps, \$5 ea; vacuum, \$10. Todd, x36492 or 992-4128.

Panasonic 31" TV, PIP, A/V inputs, \$1k OBO. Thanh, x31464.

Kenmore 27 cu ft side-by-side refrigerator/freezer, \$975. Vera, 282-3561 or 721-5743.

Hoover Quick Broom w/wheels. 286-8822.

Dining rm table w/folding ex leaf, \$50; 2-non-matching captain's chairs, \$37.50/both; foot stool, \$35; love seat, new \$750 sell \$250. 488-5564.

Two mauve swivel/rocker chairs, \$125 ea/ \$200 both. x30618.

Wicker Papasan chair w/matching tbl, \$60; blond rattan couch, chair, dining room tbl w/4 chairs, desk w/chair, coffee table & lamp tables, \$500 or trade for dk wood dining room table, Steve, x37152 or 992-7049.

Area rug 9x12 w/skid proof back, tan/ mauve, new \$225, sell \$45. Jim, x39229 or 482-7873.

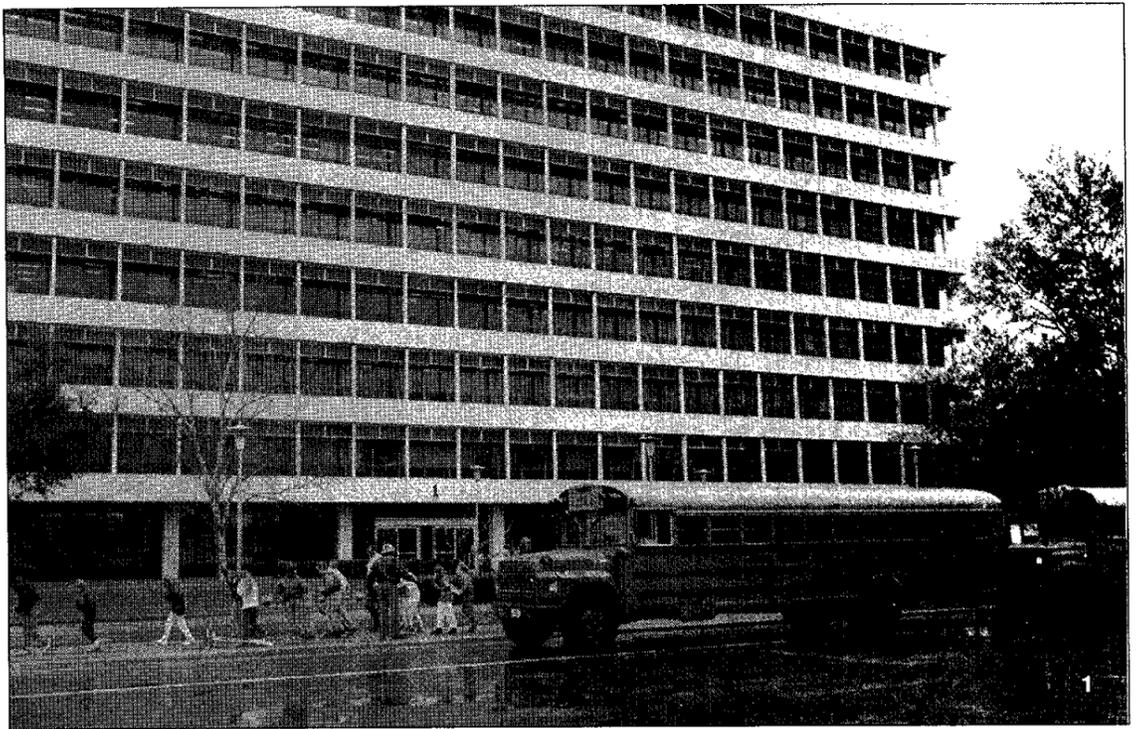
Full sz roll away bed, \$35; cherry finish cheval mirror, \$50. David, x40211.

Two piece sect couch w/2 recliners, new \$1.1k, sell \$600. Faye, 470-1455.

Round blue/gray formica table top for pedestal base, 4'. Sharon, x47951 or 286-7692.

Students learn about the Earth

Jason Project fosters interest in science and technology



By Eileen Hawley

JSC played host to more than 12,000 students over the past two weeks as part of the Jason Project V: Expedition Planet Earth activities taking place in Teague Auditorium.

The Jason Project is the brainchild of scientist and explorer, Robert Ballard, senior scientist at the Woods Hole Oceanographic Institution, who conducted well-publicized explorations of the wrecks of the Titanic and the German battleship, Bismarck. As a result of the interest created by those two expeditions, Ballard created the Jason Foundation for Education in 1989.

In partnership with private industry, scientific research facilities, museums and education organizations, the Jason Foundation provides training assistance for teachers and encourages students to pursue careers in science and technology by involving them in Ballard's world-wide exploration efforts.

This year, students are learning about the ecology of planet Earth by tracing the life of a raindrop as it falls from the sky and travels through the rain forest and ultimately to the ocean. The expedition is taking place in the

Central American country of Belize, where a cadre of scientists, ecologists and researchers also will examine Mayan ruins to determine the influence of that civilization on the environment. The Jason expeditions further carry the theme of environmental concern to the students by demonstrating its own efforts to minimize the environmental impact on the expedition sites.

Expedition activities are downlinked to 27 sites throughout the United States and Europe through a complex web of communication satellites. JSC is categorized as a primary interactive network site providing direct link-up between the exploration site in Belize and the audience at Teague. As a result, six students at each of the 50 sessions conducted over the past two weeks, had the chance to ask real-time questions of the expedition leaders, and a few even had the opportunity to control a remotely operated vehicle on the ocean floor off Belize, or a camcorder in the canopy of the rain forest.

"We have a new Interactivity Platform at Teague this year," said Bob Fitzmaurice, center education programs officer. The platform is a replica of the control panel used at the expedition site. "The teachers select six

students to submit a question to the expedition leaders. At the control panel, technicians send both audio and videotape of the students, while entering their questions on a computer to be transmitted to the expedition site." Technicians working at the control panels serve as role models for the children by demonstrating one of the technical careers open to them.

During the one-hour presentations, students learn about the relationships of the rain forest and coral reefs in the complex ecological chain. "As a technological organization, one of our main goals is to develop and maintain interest in science and other technologies in students," said Fitzmaurice. "Whether through exploration of inner space, as we are doing this year, or through studying the universe, NASA's strategic plan is to enhance and expand scientific and technological competence."

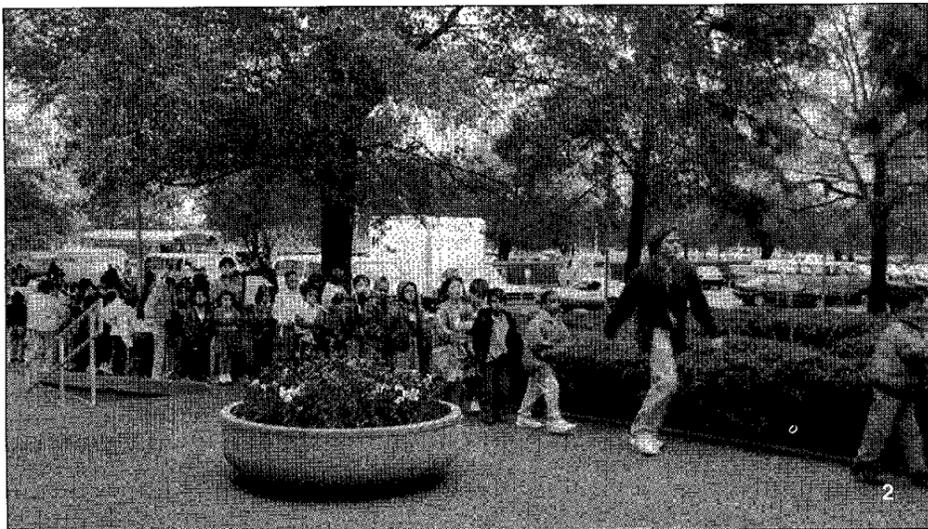
JSC and NASA may play an even larger role when next year's Jason Project VI is developed. "The expedition will involve space and space exploration in some way," Fitzmaurice said. "Also, the use of 'tele-presence' and remote-learning techniques are extremely useful in motivating these students to learn. JSC presently is examining what role

it can play in telecommunications and distance learning in the future."

JSC joined the Jason Project three years ago as a passive site hosting about 4,000 students. As a passive site, no interactive communications links existed between the expedition and Teague. "We've grown tremendously since our initial exposure to this project," Fitzmaurice said. "It's been rewarding for us and for the students and teachers as well."

The teachers, students, parents and administrators attending the sessions at Teague represented more than 70 public, private and home schools in the JSC area. Before attending the sessions at Teague, teachers were required to attend a one-day "in-service" training course at JSC. During that session, they received a Jason curriculum guide with suggested lesson plans that were designed to compliment expedition activities and to increase student interest and awareness in scientific disciplines.

The Jason Foundation for Education is sponsored by EDS Corp., the National Geographic Society and the U.S. Department of Education-Eisenhower National Program for Mathematics and Science Education. ▽



JSC Photos by Jack Jacob

1) Students leave school buses in front of Bldg. 1 on the way to Teague Auditorium for Jason Project V. 2) Teachers guide their charges toward the Auditorium. 3) Inside Teague, students review JSC's history as pictured in past issues of Space News Roundup mounted on the wall. 4) One student is videotaped asking questions of the expedition leaders. 5) At one of 50 live sessions, students learn about the environment while watching the live downlink from the expedition site.

Deadline for scholarship applications approaching

Scholarship applications for both the NASA Exchange-JSC Scholarship Program and the NASA College Scholarship Fund are due March 31.

The Exchange Council expects to award three scholarships to students on the basis of academic achievement, financial need and involvement in school or community activities. The scholarship program is open to students currently enrolled and in good academic standing in college, or who will graduate from a public, parochial or private high school this year and who are dependents of eligible JSC employees.

The scholarship offers support of

up to \$4,000 in the amount of \$400 per academic semester, \$250 per academic quarter and \$200 per summer session, or as the Exchange Council determines. In any event, the amount will not exceed \$1,000 in any one-year period.

Application forms and agreements for the scholarships are available in Bldg. 13, Rm. 207. High school applicants must furnish a transcript of their high school grades and a record of their scores on either the Scholastic Aptitude Test or the American College Test with their applications or as soon as the results become available. The test

results must be furnished prior to March 31.

College students must furnish their most recent transcript of college grades with the application, as well as a transcript of high school grades and either SAT or ACT scores.

To be considered for this year's scholarship program, completed applications must be returned by March 31 in a sealed envelope to: R. D. Schwartz, Chairman, JSC Scholarship Committee, Mail Code EA13, Johnson Space Center, Houston, TX 77058.

Application forms and scholastic records will be evaluated by the JSC

Scholarship Committee and applicants will be informed of the results by May 15.

For additional information on the NASA Exchange-JSC Scholarship fund, contact Judy Willhoite, at ext. 39138.

Applications for the NASA College Scholarship Fund also are due by March 31.

This fund will be awarding four scholarships of \$1500 each. The scholarship is renewable for six years, not to exceed \$6,000.

Applicants must be pursuing a course of study that will lead to an undergraduate degree in science

or engineering at an accredited college or university in the United States.

Applicants also must be dependents of current or retired NASA employees or dependents of former NASA employees who died while employed by NASA.

Applications are available in Bldg. 1, Rm. 840.

Completed applications may be mailed to JSC, the NASA College Scholarship Fund, Inc.; Mail Code AH12/Scholarship Committee; Houston, TX; 77058. For more information, contact Mary O'Connell, at x39168.

Flight will study Earth

In April, 1994 scientists around the world will have a unique vantage point to study how the global environment is changing when *Endeavour* is launched on STS-59.

During the nine-day mission, the Space Radar Laboratory payload in *Endeavour's* cargo bay will give scientists highly detailed information that will help them distinguish natural forms of change from those created by humans.

The data will be shared with the international scientific community so that this essential research is available worldwide to assist people in making informed decisions about protecting the environment.

Leading the STS-59 crew will be Mission Commander Sid Gutierrez. Pilot for the mission is Kevin Chilton. The four mission specialists aboard *Endeavour* are Linda Godwin, payload commander, Jay Apt, Rich Clifford and Tom Jones.

The SRL payload is comprised of the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar and the Measurement of Air Pollution from Satellite. The German Space Agency, DARA, and the Italian Space Agency, ASI, are providing the X-SAR instrument.

The imaging radar of the SIR-C/X-SAR instruments have the ability to make measurements over virtually any region at any time, regardless of weather or sunlight conditions. The radar waves can penetrate clouds, and under certain conditions, can also "see" through vegetation, ice and extremely dry sand. In many cases, radar is the only way scientists can explore inaccessible regions of the Earth's surface.

An international team of 49 science investigators and three associates will conduct the SIR-C/X-SAR experiments. The thirteen represented nations include: Australia, Austria, Brazil, Canada, China, the United Kingdom, France, Germany, Italy, Japan, Mexico, Saudi Arabia and the United States.

The MAPS experiment will measure the global distribution of carbon monoxide in the lower atmosphere.

The STS-59 mission also will fly the first cooperative initiative with the National Institutes of Health. The joint initiative in cell biology will use a special cell culture system developed by the Walter Reed Army Institute of Research.

The system known as Space Tissue Loss-4/National Institutes of Health-1 will examine the effects of microgravity on muscle and bone cells. This research also should contribute to scientists understanding of the mechanisms involved in bone loss and muscle atrophy on Earth.

An advanced cell culture device known as STL-5 will make its first flight test on board STS-59.

This new system includes a video-microscope that will allow scientists on the ground to see real-time video images of their experiments in space.

The *Endeavour* crew members also will assume the role of teacher as they educate students in the United States, Finland and Australia on what it is like to live and work in space.

Currently, launch of STS-59 on the sixth flight of *Endeavour* is targeted for April 7, 1994.



At Kennedy Space Center, STS-59 Mission Specialist Tom Jones examines *Endeavour's* payload bay as Randy McDaniels and Payload Commander Linda Godwin observe. STS-59 features the first flight of the Space Radar Laboratory, a complex and powerful radar system.

HST team wins Collier award

A team of JSC employees has been selected to receive the 1993 Robert J. Collier Trophy which is awarded annually "for the greatest achievement in aeronautics or astronautics in America."

The 11-member team consists of STS-61 crew members, Dick Covey, Ken Bowersox, Kathy Thornton, Claude Nicollier, Jeff Hoffman, Story Musgrave and Tom Akers; and mission managers Randy Brinkley, Joe Rothenberg, Brewster Shaw, and Milt Heflin. The team members were honored for their collaborative efforts during the Hubble Space Telescope servicing mission.

The team was cited for its "outstanding leadership, intrepidity, and the renewal of public faith in America's space program by the successful orbital recovery and repair of the

Hubble Space Telescope."

The HST team selection was made by a committee of 23 aviation leaders from nominations submitted by hundreds of organizations within the aerospace and aviation community. The award will be presented May 8 in Washington, D.C. at a dinner hosted by the National Aviation Club.

The trophy is named for Robert J. Collier, who commissioned sculptor Ernest Wise Keyser to cast the 525-pound bronze trophy in 1911 and subsequently donated it to the Aero Club of the United States. The trophy was first awarded in 1912 to Glenn Curtis for his pioneering work in aviation and aerospace. The original sculpture is on permanent display in the Smithsonian Institution's National Air and Space Museum.

Lost and Found

Can't find that missing watch or cufflink?

The answers to these and other questions may be found at the Security Division's lost and found office. "The Security Division holds all 'lost' goods turned in to us by employees," said Mary Perryman, administrative specialist in the Security Division. "We also maintain a listing of the items we've received, so employees can call us to find out if we have their lost item."

JSC employees who find personal property on site, should forward it to Mary Perryman at JS/MAH.

For additional information on security's lost and found services, contact Perryman at ext. 34029.

Space News Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

Dates and Data submissions are due Wednesdays, eight working days before the desired date of publication.

Editor Kelly Humphries
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Software technology to be focus of preview center

The Software Technology Branch is setting up temporary quarters at Space Center Houston.

Beginning Saturday, the branch will showcase its software applications in the NASA Preview Center located off the visitor center's main plaza. The display will highlight some of the software programs used to train astronauts and flight directors, including a demonstration of a "virtual reality" environment.

"We wanted visitors to experience some of NASA's training procedures," said Vance Ablott, general manager of Space Center Houston.

Fifteen-minute demonstrations of various training procedures will be held throughout the day at the Preview Center. For the virtual reality demonstration, a volunteer will participate in a "virtual sailing excursion" or experience a "virtual city." Visitors will share in the experience

by watching it on a large screen.

Other scheduled demonstrations include a multi-media presentation documenting the evolution of crew training from a classroom environment to simulators to virtual environments.

Additionally, the Spacehab Intelligent Familiarization Trainer used to train crews for Spacehab flights will be demonstrated, along with Physics Tutor, a software program that teaches concepts and applications of physics.

Between demonstration sessions, Software Technology Branch personnel will host question and answer sessions and assist guests as they experiment with the various software applications on display.

For additional information on showcasing JSC technology at the Preview Center, contact Louis Parker, ext. 38622

DEE provides shuttle arm with 'vision and touch'

(Continued from Page 1)

nothing but net" in basketball. Ivins then challenged her crew mates to match her feat.

DEE project managers were pleased with the crew's performance inserting the pegs into holes with exacting tolerance levels and side shafts to make insertion more difficult. The three mission specialists encountered a little more difficulty in the smallest-tolerance holes, but still performed all tasks.

"They've been able to do everything," Monford said. "We attempted to make the tasks more difficult than anything we ever tried to do with the RMS before." During the demonstrations, the astronauts rated DEE.

"On a ten-point scale, with one, being very good," Monford said "most of the comments over selected tasks were two and threes, which means there is some slight room for improvement, but basically it's a good system the way it is."

DEE has a number of applications for use in constructing an international space station. Since the magnetic end effector does not require a protruding grapple fixture, materials like radiators can be stacked in the cargo bay for subsequent deployment.

"We're looking at using the equip-

ment we already have," Monford said. "The existing arm is absolutely fantastic as far as your ability to control it and operate with it. What DEE gives it are the senses it lacked — vision and touch. These senses will allow the arm to be used with the greater dexterity that will be needed in future applications."

A number of people supported DEE development. The targeting and reflective alignment concept is enhanced by the use of an IBM 750 computer and a software program developed by Texas A&M. The Autotrac software takes the output of a television camera, analyzes it and discloses results to the crew. According to Monford, Autotrac provides a greater degree of accuracy for operations by analyzing the camera view and then providing the distance and roll cues required.

The DEE project is funded by the Office of Space Systems Development at Headquarters.

"OSS funds a number of small flight demonstration projects with the objective of providing technology applications in an orbital environment and to help develop young NASA engineers by giving them experience with flight hardware and flight hardware development," said Mike Card, DEE mission manager.

USMP-1 produces 'gold mine' of data during near record-setting mission

(Continued from Page 1)

tion of metals and alloys, delivered a "gold mine" of data that, among other things, revealed that dendrites develop more quickly than anticipated in microgravity. The data is expected to become the standard for future research.

The Advanced Automated Directional Solidification Furnace appears to have grown the longest semiconductor crystal of cadmium-mercury-telluride ever produced. After *Columbia* lands, the crystal will be sliced and polished for studies that may help scientists create improved semiconductors for

advanced electronics.

OAST-2 experiments took center stage among the scientific investigations in the payload bay toward the end of the flight as Casper and Allen lowered *Columbia's* orbit first to 140 nautical miles and then to an elliptical orbit with a low point of 105 nautical miles to study the spacecraft glow phenomenon in the visible, ultraviolet and infrared spectra.

Based on an on-time landing, *Columbia's* crew will be back for a homecoming ceremony at Ellington Field about 4:30 p.m. For the latest schedule, call the Employee Information Service at x36765.